

What is claimed is:

1. A method of cleaning a surface of a substrate processing chamber component to remove process deposits therefrom, the method comprising:
 - (a) cooling the surface comprising the process deposits to a temperature below about -40°C , thereby fracturing the process deposits on the surface.
2. A method according to claim 1 wherein the surface comprises a first thermal expansion coefficient and the process deposits comprise a second thermal expansion coefficient, and wherein the first thermal expansion coefficient is at least 2 times the second thermal expansion coefficient.
3. A method according to claim 1 wherein (a) comprises immersing the surface in a low temperature fluid.
4. A method according to claim 3 wherein (a) comprises immersing the surface in a low temperature fluid comprising liquid nitrogen.
5. A method according to claim 3 further comprising ultrasonically agitating the surface.
6. A method according to claim 1 further comprising at least one of:
 - (b) grit blasting the surface; or
 - (c) cleaning the surface with a cleaning solution comprising HF and HNO_3 .
7. A method according to claim 1 further comprising heating the surface to a temperature of at least about 150°C .
8. A method according to claim 7 further comprising, after heating the surface, flowing a cool fluid over the surface.

9. A component cleaned according to the method of claim 1, the component comprising a portion of one or more of an enclosure wall, a chamber shield, a target, a cover ring, a deposition ring, a support ring, an insulator ring, a coil, a coil support, a shutter disk, a clamp shield, and a substrate support; and

wherein the component is substantially absent process deposits.

10. A method according to claim 1 wherein the surface comprises a textured surface.

11. A method according to claim 1 wherein the surface comprises at least one of titanium, stainless steel, copper, tantalum and aluminum, and the process deposits comprise at least one of tantalum, tantalum nitride, titanium, titanium nitride, copper, aluminum, tungsten and tungsten nitride.

12. A method of cleaning a surface of a substrate processing chamber component to remove process deposits therefrom, the method comprising:

- (a) heating the surface comprising the process deposits to a temperature of at least about 150°C, thereby loosening the process deposits; and
- (b) removing the process deposits.

13. A method according to claim 12 wherein (a) comprises heating the surface to a temperature of at least about 300°C.

14. A method according to claim 12 wherein (a) comprises heating the surface to a temperature of at least about 500°C.

15. A method according to claim 12 wherein the surface comprises a first thermal expansion coefficient and the process deposits comprise a second thermal expansion coefficient, and wherein the first thermal expansion coefficient is at least 2 times the second thermal expansion coefficient.

16. A method according to claim 12 wherein (b) comprises cooling the surface by at least one of (i) immersing the surface in a fluid, and (ii) spraying the surface with the fluid.

17. A method according to claim 12 comprising grit blasting the surface.

18. A method according to claim 12 comprising cleaning the surface with a cleaning solution comprising HF and HNO₃.

19. A method according to claim 12 comprising, before (a), immersing the surface in a bath comprising liquid nitrogen.

20. A component cleaned according to the method of claim 12, the component comprising a portion of one or more of an enclosure wall, a chamber shield, a target, a cover ring, a deposition ring, a support ring, an insulator ring, a coil, a coil support, a shutter disk, a clamp shield, and a substrate support; and wherein the component is substantially absent process deposits.

21. A method of cleaning a surface of a substrate processing chamber component to remove process deposits therefrom, the method comprising:

(a) immersing the surface comprising the process deposits in a bath comprising liquid nitrogen to form fractures in the process deposits;

(b) heating the surface to a temperature of at least about 150°C, thereby expanding the fractures;

(c) cooling the surface by flowing a fluid over the surface, thereby forming further fractures; and

(d) removing the fractured process deposits by at least one of grit blasting the surface or cleaning the surface with a cleaning solution.

22. A method according to claim 21 wherein (a) comprises heating the surface to a temperature of at least about 300°C.

23. A method according to claim 21 wherein (a) comprises heating the surface to a temperature of at least about 500°C.

24. A method according to claim 21 wherein the surface comprises a first thermal expansion coefficient and the process deposits comprise a second thermal expansion coefficient, and wherein the first thermal expansion coefficient is at least 2 times the second thermal expansion coefficient.

25. A method according to claim 21 wherein (a) further comprises ultrasonically agitating the surface.

26. A method according to claim 21 wherein (c) comprises one or more of (i) immersing the surface in water, and (ii) spraying water onto the surface.

27. A method according to claim 21 wherein (d) comprises cleaning with a cleaning solution comprising HF and HNO₃.

28. A component cleaned according to the method of claim 21, the component comprising a portion of one or more of an enclosure wall, a chamber shield, a target, a cover ring, a deposition ring, a support ring, an insulator ring, a coil, a coil support, a shutter disk, a clamp shield, and a substrate support; and wherein the component is substantially absent process deposits.